



# Outline

- Aircraft
- Mathematics
- Medical Science
- Games
- Textiles
- Metallurgy
- Weapons
- Religions

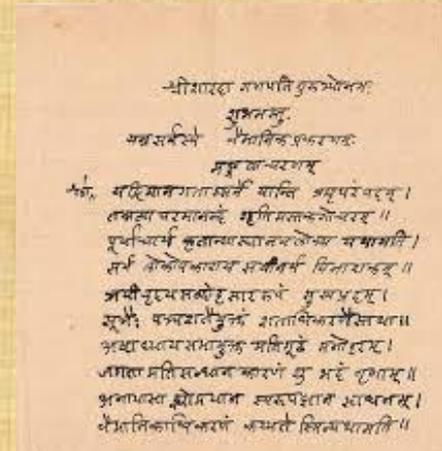
# Air craft

- In 1895, Sanskrit scholar **Shivkur Bapuji Talpade**, flew an unmanned aircraft(**Marut-sakthi**) at Chowpathy beach of Bombay, eight years before Wright Brothers
- This aircraft flew to a height of 1500 feet
- Deccan Herald in 2003 stated "*scholarly audience headed by a famous Indian judge and, Mahadeva Govin-da Ranade and a nationalist H H Sayaji Rao Gaekwad*



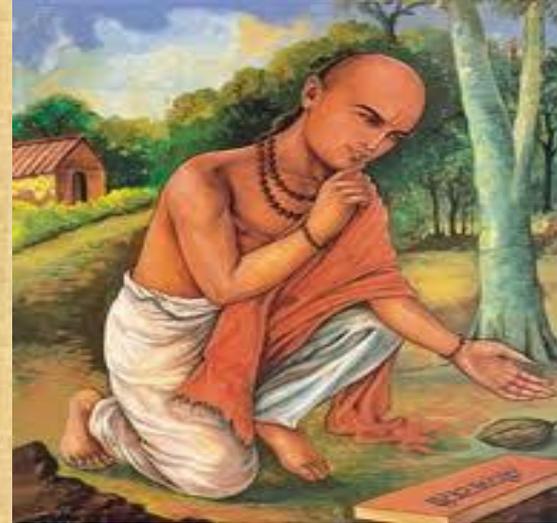
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- At the Bharat Itihas Sanshodhak Mandal in Pune, there exists an undated handwritten manuscript of Vaimanikprakarnm, a treatise on aerodynamics
- Talpade studied and consulted a number of Vedic treatises
  - *Brihad Vaimanika Shastra* of Maharishi Bharadwaja
  - *Vimana-chandrika* of Acharya Narayan
  - *Muni Viman yantra* of Maharish Shownik
  - *Yantra Kalp* by Maharishi Garg
  - *Muni Viman Bindu* of Acharya Vachaspati
  - *Vimana Gyanarka Prakashika* of Maharishi Dhundiraj



# THEORY OF GRAVITATION

- In his book **Sidhanta Shiromani**, **Bhaskaracharya** mentions about force of attraction resembling gravity, discovered centuries later by **Newton**



**P. JOHNSTONE** “Gravitation was known to the **Indians** before the birth of Newton. The system of blood circulation was discovered by them centuries before Harvey was heard of.”

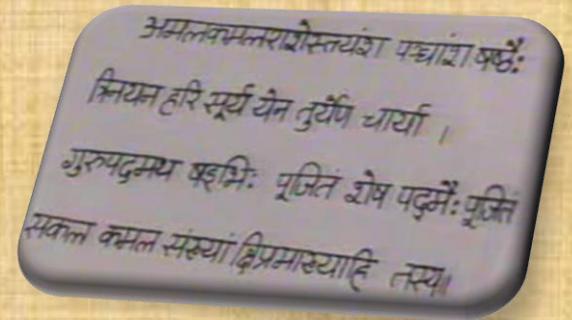
If the total number of flowers is  $x$ :

$$X = (1/3 + 1/5 + 1/6 + 1/4)x + 6$$

$$X = 57x/60 + 6$$

$$X = 120$$

So, there were 120 lotus flowers



- Bhaskaracharya (5th century AD) calculated the **time taken** by the **earth to orbit the sun**
- Time taken by earth to orbit the sun was mentioned: 365.258756484 days.
- Bhaskaracharya also invented Many formulae for **MULTIPLICATIONS**
- First person to find Derivatives and Calculus

# Mathematics :The value of PI

- The value of “pi” was first calculated by **Budhayana** (5th century AD)
- he explained the concept of what is known as the **Pythagoras Theorem**. He discovered this in the 5th century long before the European mathematicians.



# Quadratic equation

- Quadratic equation was discovered by **Sridharacharya** in the **11th century**.
- The largest numbers the Greeks and Romans used were 106
- In 5000 BC Indians used numbers as big as  $10^{53}$  (10 to the power 53) with specific names.
- The largest used no.

today is Tera  $10^{12}$

—	=	⊥	⊥	॥	७	२	α	α	α
1	2	4	4	6	7	9	10	10	10
○	+	∞	ㄣ	π	ㄣ	ㄣ	ㄣ	ㄣ	ㄣ
20	60	80	100	100	100	200	200	200	400
ㄣ	ㄣ	ㄣ	ㄣ	ㄣ	ㄣ	ㄣ	ㄣ	ㄣ	ㄣ
700	1000	1000	4000	6000	10,000	20,000	20,000	20,000	20,000

# NUMERALS

- In 4th century BC, **Panini** was the first to come up with the idea of using letters of the alphabet to represent numbers
- Numerals are found in the inscriptions of **Ashoka** the Great in the 3rd Century BC.
- This knowledge traveled from there to Arab countries and from there to Europe and West.
- Laplace, the French mathematician , wrote during Napoleon's time, "***It is India that gave us the ingenious method of expressing all numbers by means of ten symbols.***

# DECIMAL SYSTEM

- 'Decimal System' were developed in India in 100 B.C
- According to Dr. Thomas Arya, a German writer, "***The measurments used by the Indus Valley (2500 BC) based on the decimal system***".
- Pierre Laplace said, "***How grateful we should be to the Indus who discovered the great Decimal System!***"

# Binary Numeral System

- **Pingala** is the name of the author of the **Chandahshastra** (also called **Chandaḥsūtra** )
- The **Chandahsastra** presents the first known description of a binary numeral system around 5th–2nd centuries BC
- Pingala's work also contains the Fibonacci number, called *matra-meru*,

# ARITHMETIC

- Arithmetic was discovered by Indians in about 2nd Century BC.
- **Bhaskaracharya's** book '**Lilavathi**' is regarded as the first book on modern arithmetic.
- The Arabs learnt and adopted it from India and spread it to Europe.
- “In 499 AD **Aryabhatta** finished his work '**Aryabhatta**', giving rules of Arithmetic” (Encyclopedia Britannica).

# GEOMETRY AND TRIGNOMETRY

- The brick work of **Harappa and Mohenjodaro** civilization shows that the people of ancient India (2500 BC) possessed knowledge of Geometry.
- Aryabhatta formulated the rules for finding the **area of a triangle**, which shows the origin of Trigonometry.

# 0

- **Brahmagupta** was the first mathematician to treat (0) as a number and showed its mathematical operations.
- **LANCELOT HOGBEN** In his book 'Mathematics for the Millions' *"There has been no more revolutionary contribution than the one which the Indians made when they invented ZERO."*
- **ALBERT EINSTEIN** *"We owe a lot to the Indians who taught us how to count, without which no worthwhile scientific discovery could have been made."*

# Brahmasputha Siddhanta on Zero

- The sum of zero and a negative number is negative.
- The sum of zero and a positive number is positive.
- The sum of zero and zero is zero.
- The sum of a positive no and a negative no is their difference; or, if their values are equal then zero.
- A positive or negative number when divided by zero is a fraction with the zero as denominator.
- Zero divided by a negative or positive number is either zero or is expressed as a fraction with zero as numerator and the number as denominator.
- Zero divided by zero is zero.

# **Education : World's First University**

- The world's first university was established in Takshashila in 700 BC.**
- Here more than 10,500 students from all over world studied more than 60 subjects.**
- The University of Nalanda built in the 4th century BC**
- The Chinese scholar Kiuen Tsang also studied in Nalanda.**

# Medical : SURGERY

- Modern plastic surgery has its origin to India.
- Plastic surgery was done by Sushrutta, an Indian physician of the 4<sup>th</sup> Century BC.
- his team conducted complicated surgeries like cataract, artificial limbs, cesareans, fractures, urinary stones, plastic surgery and brain surgeries, over 2600 years ago

# Yog

- Yog(Yoga) has its origins in India and has existed for over 5,000 years
- Monks like Swami Vivekananda, brought yoga to the West in the late 19th century.
- In the 1980s, yoga became popular as a system of physical exercise across the Western world

# MEDICINE SYSTEM

- Ayurveda is the earliest school of medicine known to mankind.
- The father of medicine, Charaka, consolidated Ayurveda 2500 years ago.
- Usage of anaesthesia was well known in ancient Indian medicine.
- Detailed knowledge of anatomy, embryology, digestion, metabolism, physiology, etiology, genetics and immunity is also found in many ancient Indian texts

# Kalari

- Indian Martial Art :Written evidence of martial arts in Southern India dates back to 2nd century BC to 2nd century AD
- The litererecher like Akananuru and Purananuru describe the use of spears, swords, shields, bows and silambam in the Sangam era
- It speaks of the Kalari talents of Tamil kings of the Chera, Chola & Pandya dynasties.

# ASTRONOMY

- The knowledge of the motion of heavenly bodies was discovered by Aryabhata (499 AD), Latadeva (505 AD), and Brahmagupta (628 AD) calculating the timing of eclipses.
- In Surya Sidhanta, Latadeva talked about the earth's axis and called it SUMEGU.
- *“That the earth is a sphere and it rotates on its own axis”* was known to Varahamihira and other Indian astronomers much before Copernicus published this theory. (Jewish Encyclopedia)

# CALENDAR

- Discovery of measurement of time and discovery of nomenclature of days, months and years
- invention of calendar making was made in India. In his book Surya Sidhanta Latadeva (505 AD) divided the year into 12 months,
- Seven planets of the solar system affect the earth's atmosphere and their names were added to the seven days of the week,
- which was accepted all over the world.

# TOWNSHIPS

- Excavation at *Harappa and Mohenjodaro* shows India was adopting advanced house building and town planning techniques,
- including two stadium
- and water management system in the year 2500 BC.

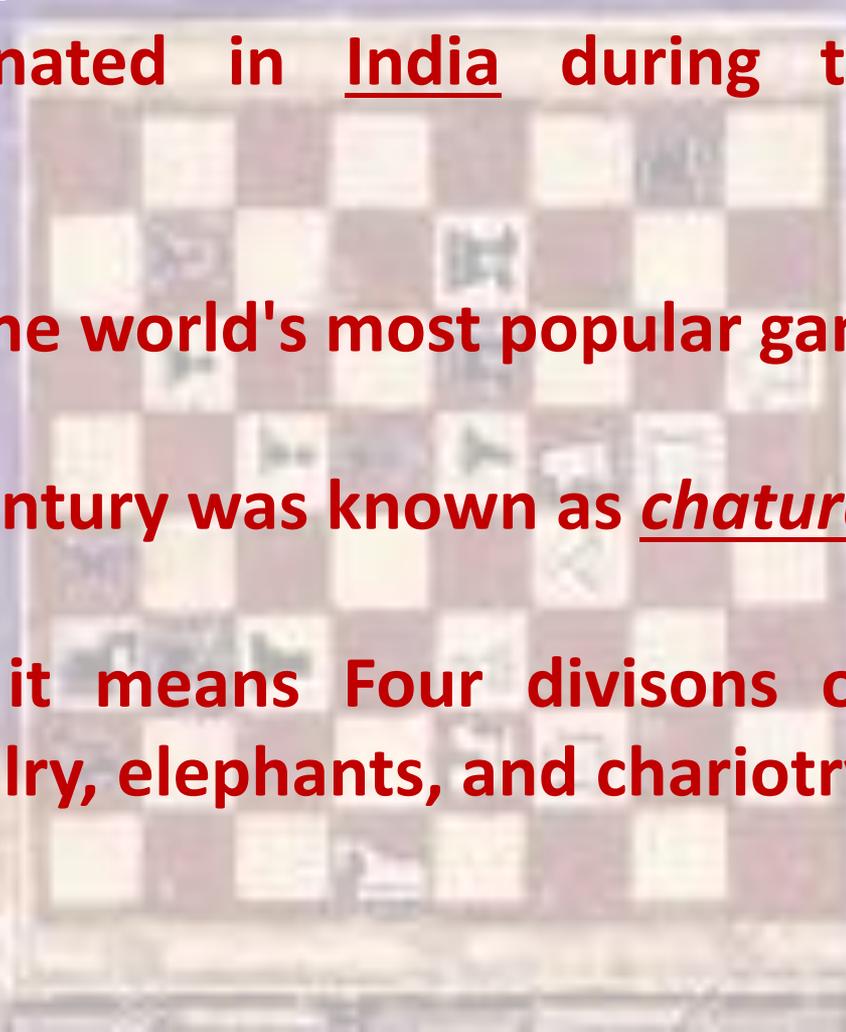
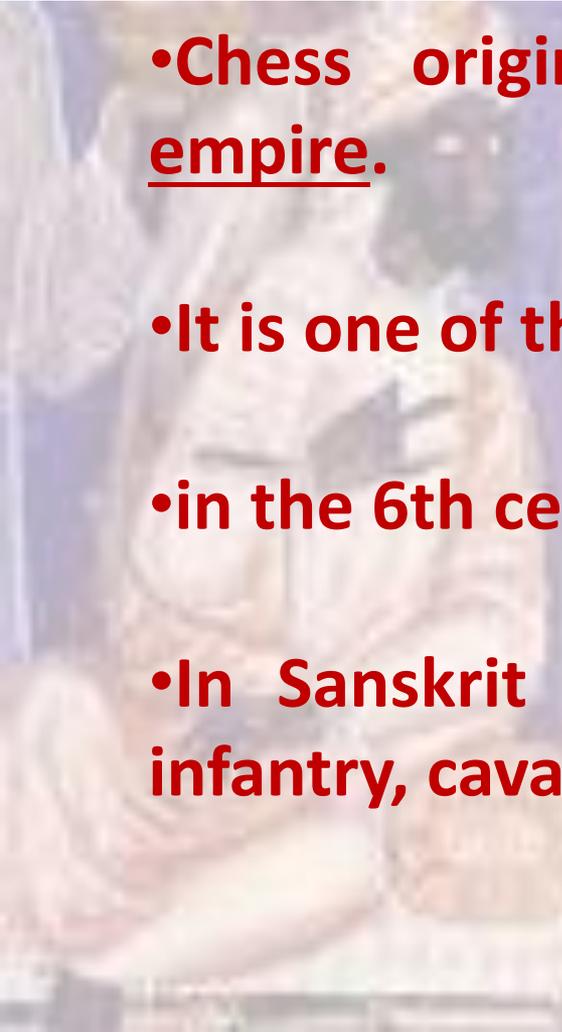
# **First Granite Temple**

- **The World's First Granite Temple is the Brihadeswara Temple at Tanjavur, Tamil Nadu.**
- **The shikhara of the temple is made from a single 80-tonne piece of granite.**
- **This magnificent temple was built in just five years, (between 1004 AD and 1009 AD) during the reign of Raja Chola**

# Games: Chess



- Chess originated in India during the Gupta empire.
- It is one of the world's most popular games
- in the 6th century was known as chaturanga
- In Sanskrit it means Four divisions of Military infantry, cavalry, elephants, and chariotry

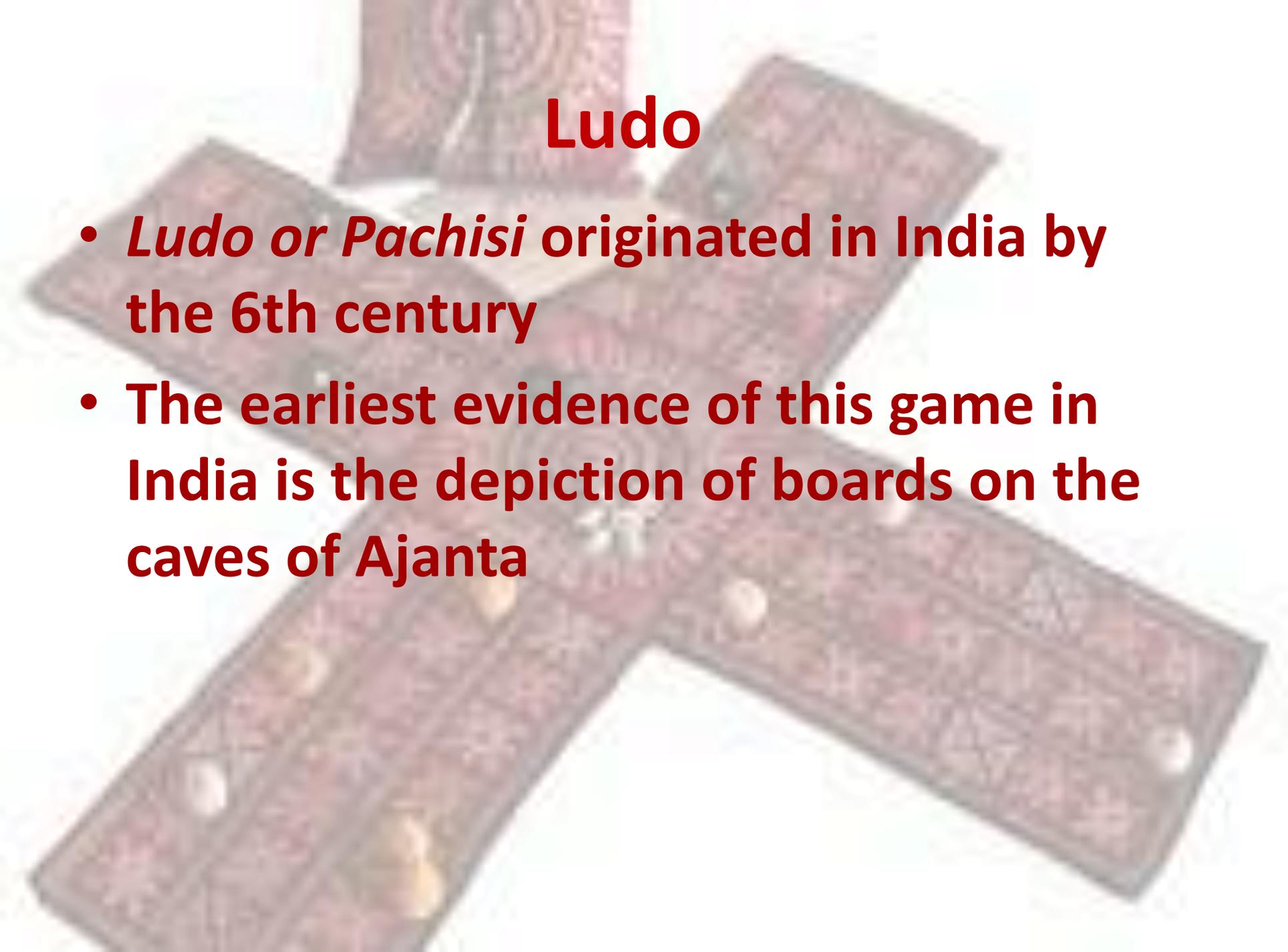




# Snakes & Ladders

- The game of Snakes & Ladders was created by the 13th century poet saint Gyandev.
- It was originally called 'Mokshapat'.
- The ladders in the game represented virtues and the snakes indicated vices.
- The game was played with cowrie shells and dices. In time, the game underwent several modifications, but its meaning remained the same, i.e. good deeds take people to heaven and evil to a cycle of re-births

# Ludo

A wooden Ludo board, also known as Pachisi, is shown. It has a cross-shaped design with four arms. The board is made of light-colored wood and has several small, round wooden pieces placed on it. The pieces are arranged in a way that suggests a game in progress. The board is set against a plain white background.

- ***Ludo or Pachisi*** originated in India by the 6th century
- **The earliest evidence of this game in India is the depiction of boards on the caves of Ajanta**

# Textile

- The earliest cotton in the world was spun and woven in India.
- Roman emperors would wear delicate cotton from India that they would call “woven winds.”
- Mogul emperors called the fabrics “morning dew” and “cloth of running water.”

# Calico/Chintz

- **Calico** originated in Kozhikode (also known as Calicut in Kerala) during the 11th century
- By 1680 more than a million pieces of chintz were being imported into England, France and the Dutch Republic per year
- In 1686 the French declared a ban on all chintz imports
- In 1700 an Act of Parliament was passed to prevent the importation of dyed or printed calicoes from India to protect British textile industry.

# Palampore

- **Palampore** is a type of hand-painted and mordant-dyed bed cover
- It was made in India during the eighteenth century.
- Only the wealthiest classes could afford to buy Palampore

# Crucible steel / Wootz Steel

- Crucible steel was produced in south India i.e. Konasamudram and Gatihosahalli,
- During 16th century Wootz steel was widely exported and traded throughout ancient Europe, China, the Arab world
- Wootz Steel produced in Kodumanal, near Coimbatore in Tamil Nadu



# USE OF COPPER, BRONZE AND ZINC

- The copper and bronze artefacts date back to the Indus Valley Civilisation (2500 BC).
- According to treatise Rasaratnakar, *Zinc was made in around 50 BC at Zawar in Rajasthan*

# Weapons: Rockets

- Rockets were developed by Tipu Sultan and Hyder Ali in the 1780s
- According to Stephen Oliver Fought and John F. Guilmartin, Jr. in *Encyclopedia Britannica* (2008), "Hyder Ali, prince of Mysore, developed war rockets"



# Atom Bomb

- Julius Robert Oppenheimer “The Father of the Atomic Bomb”.
- “Was the atomic test at Alamogordo the first nuclear blast?”
- He said “ yes in modern times”
- Mahabharata tells about the affect of Brahmastra and the descriptions matches the result of a atomic blast



# Shampoo

- The word *shampoo* in English is derived from the word *chāmpo* in Hindi
- In 1762 , **Sake Dean Mahomed** from Bihar open a Bath in Brighton, England.
- where clients received a treatment of *champi* (shampooing)
- After that he was appointed ‘Shampooing Surgeon’ to both **George IV** and **William IV**.

# Religions & Spirituality

- The four religions born in India - **Hinduism, Buddhism, Jainism, and Sikhism**
- Jainism and Buddhism were founded in India in 600 B.C. and 500 B.C
- **Sikhism originated** in the Holy city of Amritsar in Punjab, the city was founded in 1577
- **Varanasi**, also known as Benaras, is the oldest, continuously inhabited city in the world
- The Vishnu Temple in the city of **Tirupathi** built in the 10th century, is the world's largest religious pilgrimage destination
- an average of 30,000 visitors donate \$6 million (US) to the temple everyday

**Thank You**